

I CLAIM:

1. A tilt switch adapted to be in electric contact with a support, said tilt switch comprising:

5 a housing body adapted to be mounted on the support in an upright direction, and including:

a top wall which extends in a longitudinal direction that is transverse to the upright direction, and which has a modular concavity extending downwardly,

10 a bottom wall which has a bottom wall surface that confronts said modular concavity and that is spaced apart from said top wall by a modular depth, and

right and left inner modular walls which are spaced apart from each other by a modular width to confine said concavity in the longitudinal direction, and which have respectively
15 emitting and receiving slits that extend respectively therethrough in both the longitudinal and upright directions, and that are aligned with each other in the longitudinal direction to permit passage of a broader beam of light;

light emitting and receiving units which are disposed in said
20 housing body, and which are respectively disposed rightwardly and leftwardly of said right and left inner modular walls to respectively emit and receive the broader beam of light that passes through said emitting and receiving slits;

a modular insert body including:

25 entry and exit walls which are opposite to and which are distant from each other in the longitudinal direction by a modular thickness that is slightly smaller than the modular

width, said entry wall having an entry hole which extends in the longitudinal direction and towards said exit wall, and which is configured to admit entry of only a portion of the broader beam of light into said entry hole, thereby forming a narrower beam of incident light in said entry hole so as to continue to pass through said receiving slit along a light path when said modular insert body is inserted into said concavity in the upright direction to contact said bottom wall surface of said bottom wall and when said entry and exit walls are brought to confront said right and left inner modular walls, respectively, and

an inner peripheral wall disposed between said entry and exit walls to confine an accommodation chamber which extends in the longitudinal direction to communicate with said entry hole, and which has a transit route that extends to intersect the light path at an intersection;

a ball member received in said accommodating chamber, rollable across said intersection, and displaceable from a first position where said housing body is steady in the upright direction, to a second position where said housing body is tilted relative to the upright direction;

an optoelectronic sensor member which is secured to said housing body, and which includes two electric contact terminals that extend downwardly and outwardly of said housing body so as to be adapted to be connected electrically to the support, and an optoelectronic switch which electrically couples said electric contact to said light receiving unit such that said optoelectronic

switch shifts from a first switch state to a second switch state when said ball member is lunched as a result of tilting to roll across said intersection from the first position to the second position, thereby interrupting or restoring the transmission of the narrower beam of incident light; and

a modular cover configured to cover said modular concavity so as to prevent ambient light from entering thereinto.

2. A tilt switch according to Claim 1, wherein said entry wall has a rolling surface which includes a central area and a surrounding area surrounding said central area, and which is inclined from said surrounding area to said central area radially and in the longitudinal direction so as to locate said ball member at said central and surrounding areas respectively when in the second and first positions, said entry hole being formed in said central area and extending along the light path such that when said housing body is steady in the upright direction, said ball member is displaced to said surrounding area to steer clear of said intersection so as to permit the narrower beam of incident light to pass through said receiving slit, thereby placing said optoelectronic switch in the first switch state, and such that when said housing body is tilted, said ball member is displaced to said central area across said intersection to interrupt the transmission of the narrower beam of incident light so as to place said optoelectronic switch in the second switch state.

3. A tilt switch according to Claim 2, wherein said inner peripheral wall has an inner cylindrical wall surface which extends from said surrounding area in the longitudinal direction

to confine said accommodation chamber and which terminates at said exit wall to define a left access opening configured to permit insertion of said ball member into said accommodation chamber.

4. A tilt switch according to Claim 1, wherein said modular insert
5 body has an outer cylindrical wall surface which surrounds the light path, and which has a lower abutment region that abuts against said bottom wall surface of said bottom wall when said modular insert body is inserted into said concavity.

5. A tilt switch according to Claim 1, wherein said accommodation
10 chamber is in form of a cylindrical tubular recess which extends in the upright direction towards said bottom wall surface, and which has an upper access opening to permit insertion of said ball member into said recess, said recess being dimensioned to define said transit route that extends in the upright direction
15 for displacement of said ball member in the upright direction between the first and second positions.

6. A tilt switch according to Claim 5, wherein said cylindrical
20 tubular recess terminates at a lower region which is disposed opposite to said upper access opening relative to the light path such that when said housing body is steady in the upright direction, said ball member is located in said lower region to interrupt the transmission of the narrower beam of incident light so as to place said optoelectronic switch in the first switch state, and such that when said housing body is tilted, said ball member
25 rolls out of said lower region to restore the transmission of the narrower beam of incident light so as to place said optoelectronic switch in the second switch state.

7. A tilt switch according to Claim 5, wherein said cylindrical tubular recess extends in the upright direction through said modular insert body to terminate at a lower region which is disposed opposite to said upper access opening relative to the light path such that when said housing body is steady in the upright direction, said ball member is located in said lower region where said ball member steers clear of said intersection so as to permit the narrower beam of incident light to pass through said receiving slit, and such that when said housing body is tilted, said ball member is displaced across said intersection so as to interrupt the transmission of the narrower beam of incident light.

8. A tilt switch according to Claim 1, wherein said accommodation chamber is in form of a cylindrical tubular recess which extends in a transverse direction transverse to both the longitudinal direction and the upright direction, and which is dimensioned to define said transit route that extends in the transverse direction for displacement of said ball member in the transverse direction between the first and second positions, said cylindrical tubular recess having a front access opening for insertion of said ball member into said recess, and a rear region which is opposite to said front access opening in the transverse direction and relative to the light path such that when said housing body is steady in the upright direction, said ball member rolls out of said rear region so as to permit the transmission of the narrower beam of incident light, and such that when said housing body is tilted, said ball member is disposed in said rear region so as to interrupt the transmission of the narrower beam

of incident light,.

5 9. A tilt switch according to Claim 1, wherein said inner peripheral wall has a lower rolling surface which defines a bottom end of said accommodation chamber, which includes a central area and a surrounding area surrounding said central area, and which is inclined from said surrounding area to said central area radially and in the upright direction so as to locate said ball member at said central and surrounding areas respectively when in the first and second positions, said entry hole being located
10 such that when said housing body is steady in the upright direction, said ball member is displaced to said central area and across the light path so as to interrupt the transmission of the narrower beam of incident light, and such that when said housing body is tilted, said ball member is displaced to said surrounding area
15 to steer clear of said intersection so as to permit the narrower beam of incident light to pass through said receiving slit.

10. A tilt switch according to Claim 1, wherein said modular cover has a lower abutment surface which abuts against said modular insert body so as to retain said modular insert body to abut against
20 said bottom wall surface of said bottom wall.